10/574262

PATENT

DK-US030634 IAP20 Rec'd PCT/PTO 31 MAR 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:
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Serial No.: New – (National Phase of PCT/JP2004/014913)	:
International filing date: October 8, 2004	:
For: OUTDOOR UNIT OF AN AIR CONDITIONER (As Amended)	:

SUBMISSION OF TRANSLATION

Assistant Commissioner of Patents
Washington, DC 20231

Sir:

Applicants submit herewith an English translation of International Patent Application No. PCT/JP2004/014913 including 30 pages of Specification and 8 sheets of drawings.

The attached document represents a true and complete English translation of International Patent Application No. PCT/JP2004/014913.

Respectfully submitted,

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Dated: 3-31-06

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SPECIFICATION

OUTDOOR UNIT OF AIR CONDITIONER

TECHNICAL FIELD

The present invention relates to an outdoor unit of an air conditioner, and in particular to an outdoor unit of an air conditioner which is partitioned into a fan chamber disposed with a fan and a machine chamber other than the fan chamber and in which a heat-emitting part is disposed.

BACKGROUND ART

In an outdoor unit of an air conditioner, usually the inside of a casing of the outdoor unit is partitioned into a fan chamber and a machine chamber by a partition plate extending in the vertical and front-rear directions when seen in front view. A heat exchanger, a ventilation fan, and the like are disposed in the fan chamber, and a compressor, a reactor, and the like are disposed in the machine chamber. Further, an electrical parts unit that internally houses various kinds of electrical parts, such as a power transistor and a condenser, is disposed in the machine chamber. Drive power is supplied to the ventilation fan, the compressor, and the like, and drive control thereof is conducted by a control circuit inside the electrical parts unit. The electrical parts inside the electrical parts unit are ordinarily mounted on a printed wiring board.

Incidentally, in recent years, technology has come to be often utilized which frequency-controls (i.e., inverter-controls) the running of the compressor to more finely control the running state. In order to conduct such inverter control, a reactor or the like, which is a heat-emitting part, is often used, and it becomes necessary to cool the heat-emitting part in accompaniment therewith.

To this end, as described in Patent Document 1 below, an outdoor unit of a conventional air conditioner is configured such that an opening is disposed in the partition plate and the reactor is disposed bordering the space inside the fan chamber so that cooling of the reactor is conducted. That is, when the ventilation fan of the outdoor unit rotates, air flows from the outside of the outdoor unit into the fan chamber of the outdoor unit through the heat exchanger, which creates a flow of air in the vicinity of the reactor that is a heat-emitting part. This flow of air can cool the reactor because it disperses the heat accumulating in the vicinity of the reactor.

<Patent Document 1>

Japanese Patent Application Publication No. H09-292142

DISCLOSURE OF THE INVENTION

<Problem that the Invention is to Solve>

Incidentally, in the aforementioned outdoor unit, the portion of the reactor bordering the space inside the fan chamber is just one portion of the entire reactor, and it is difficult to sufficiently cool the entire reactor even when a flow of air is created by the ventilation fan. For this reason, there is the potential for the reactor to become unable to sufficiently exhibit its function due to factors such as the temperature of the reactor rising and restrictions being placed on its condition of use, and there is no choice but to use a reactor that is highly heat-resistant, which leads to an increase in cost.

In order to counter this problem, the reactor can be covered with an air-permeable casing in order to sufficiently cool the reactor, and the entire reactor can be disposed inside the fan chamber. However, because the outdoor unit is disposed outdoors, there is the risk that rainwater or the like may enter the inside of the fan chamber and reach the reactor. If the reactor ends up including moisture in this manner, there is the potential for a short circuit, and there is no choice but to use a reactor that is highly heat-resistant, which of course leads to an increase in cost.

It is an object of the present invention to provide an outdoor unit of an air conditioner that can improve the effect of cooling a heat-emitting part while preventing water from coming into contact with the heat-emitting part.

<Means for Solving the Problem>

An outdoor unit of an air conditioner recited in claim 1 is partitioned into a fan chamber disposed with a fan and a machine chamber other than the fan chamber and in which a heat-emitting part is disposed. The outdoor unit includes a casing and a impermeable plate. The casing is disposed inside the fan chamber, is disposed with openings, and houses inside the heat-emitting part. The impermeable plate employs a structure where the impermeable plate is disposed in the casing between a position where the openings are disposed and a position where the heat-emitting part is housed, and through which it is more difficult for water to pass than air. As the impermeable plate here through which it is more difficult for water to pass than air, a plate disposed with numerous sponge-like minute holes, or a plate with a structure including a portion facing upward in the flow path of the air taken in through the openings in the casing, is included. The plate disposed with numerous minute holes here uses a plate disposed with numerous minute holes than can trap water droplets of a certain size based on the sizes of water droplets, and allows air to pass while trapping water so that the air and water are separated. Further, the plate having a structure including a portion facing upward in the flow path of the air separates water and air based on the specific

gravities of water and air, that is, due to the property that it is more difficult for water, whose specific gravity is larger than that of air, to rise.

In an outdoor unit of a conventional air conditioner, sometimes the cooling of the heat-emitting part cannot be sufficiently conducted because cooling is conducted only with respect to part of the entire heat-emitting part. Further, even when the heat-emitting part is disposed inside the fan chamber and sufficient cooling is conducted, there is the potential for rainwater or the like to enter the inside of the fan chamber of the outdoor unit and impart moisture to the reactor, which may lead to a short circuit.

However, in the outdoor unit of the air conditioner pertaining to claim 1, the casing for housing the heat-emitting part is disposed inside the fan chamber disposed with the fan, and openings are disposed in the casing. For this reason, a flow of air is created from these openings toward the inside of the casing as a result of the fan being driven, and the accumulation of heat due to the heat emitted from the heat-emitting part housed inside the casing being dispersed can be suppressed. Further, because the casing is disposed inside the fan chamber of the outdoor unit, outdoor rainwater or the like can reach the casing. However, here, the impermeable plate through which it is more difficult for water to pass than air is disposed between the position where the openings in the casing are disposed and the position where the heat-emitting part is housed. For this reason, even when moisture is mixed with the air and enters through the openings in the casing, the amount of moisture reaching the place where the heat-emitting part is disposed can be effectively reduced by the impermeable plate. For this reason, here, the effect of cooling the heat-emitting part can be improved while preventing water from coming into contact with the heat-emitting part.

Here, when the openings disposed in the casing are plurally present, an outdoor unit is also included where a impermeable plate is disposed between each opening and the heat-emitting part. Moreover, an outdoor unit is also included where plural impermeable plates are disposed between the position where the openings in the casing are disposed and the position where the heat-emitting part is housed. Further, an outdoor unit is also included where the casing and the impermeable plate are integrally formed rather than the impermeable plate being disposed between the openings in the casing and the heat-emitting part.

An outdoor unit of an air conditioner of claim 2 comprises the outdoor unit of an air conditioner of claim 1, wherein the casing is disposed on the upper side of the fan chamber.

In an instance where the outdoor unit is directly disposed in a place such as on the ground outdoors or on a floor, when the outdoor unit becomes submerged in water due to

outdoor rain or the like, there is the potential for the casing in which the heat-emitting part is housed to also become submerged in water.

However, here, the casing housing the heat-emitting part is disposed on the upper side of the fan chamber of the outdoor unit. For this reason, even if the outdoor unit becomes temporarily becomes submerged in water, the risk of the heat-emitting part also becoming submerged in water can be reduced.

An outdoor unit of an air conditioner of claim 3 comprises the outdoor unit of an air conditioner of claim 1 or 2, further comprising an electrical parts unit. The electrical parts unit disposes, inside the machine chamber, electrical parts other than the heat-emitting part.

When other electrical parts are disposed adjacent to the heat-emitting part, there is the potential for the heat from the heat-emitting part to accumulate in the vicinity of the other electrical parts. Additionally, when the other electrical parts are parts that are easily adversely affected by heat, it is necessary to sufficiently cool the heat-emitting part to the extent that the heat-emitting part does not adversely affect the other electrical parts, but sometimes such sufficient cooling is difficult. Today, when the disposed distance between the heat-emitting part and other electrical parts is becoming shorter and shorter in accompaniment with the compactification of outdoor units, this is becoming a more critical problem because it is easy for the heat from the heat-emitting part to accumulate due to the proximity of the heat-emitting part to the other electrical parts.

However, here, because the other electrical parts disposed in the electrical parts unit are disposed inside the machine chamber, the other electrical parts can be disposed in a chamber that is different from that of the heat-emitting part housed in the casing inside the fan chamber. For this reason, the adverse affects imparted to the other electrical parts by the heat emitted from the heat-emitting part can be reduced.

It will be noted that even when it is not just the heat-emitting part that emits heat but also the other electrical parts, the adverse affects that can occur due to these heat emissions can be reduced because the heat-emitting part and the other electrical parts that emit heat can be disposed in different chambers.

An outdoor unit of an air conditioner of claim 4 comprises the outdoor unit of an air conditioner of claim 3, wherein the casing is disposed inside the fan chamber at the side opposite from the side near the machine chamber.

Here, the casing is disposed at the side opposite from the side near the machine chamber. For this reason, the distance between the heat-emitting part and the other electrical parts disposed inside the machine chamber can be set long. Thus, the heat emitted

from the heat-emitting part can be prevented from leaking to the other electrical parts, and the adverse affects that the heat-emitting part can exert on the other electrical parts can be effectively suppressed.

An outdoor unit of an air conditioner of claim 5 comprises the outdoor unit of an air conditioner of any one of claims 1 to 4, further comprising a fan base. By using this fan base, the fan is disposed in the fan chamber. Additionally, the casing is attached to the fan base.

The casing is disposed in the fan chamber of the outdoor unit in order to conduct cooling of the heat-emitting part housed inside. When the casing is disposed in fan chamber in this manner, ordinarily a support rod or the like for disposing the casing must be newly disposed inside the fan chamber.

However, here, the casing is attached to the fan base for attaching the fan. For this reason, the fan base can be used not only as a base for disposing the fan but also as a base for disposing the casing. Thus, an increase in the number of parts necessary to dispose the casing can be suppressed. Consequently, even when the casing is disposed in the fan chamber, an increase in the number of parts that obstruct the blowing in the blow chamber is suppressed, and a reduction in the blowing efficiency can be suppressed.

An outdoor unit of an air conditioner of claim 6 comprises the outdoor unit of an air conditioner of any one of claims 1 to 5, wherein the impermeable plate includes protruding portions that protrude in a direction from the portion housing the heat-emitting part toward the openings in the casing. The protruding portions include, in their lower end portions, water-stopping holes that allow the space in the vicinity of the heat-emitting part and the space in the vicinity of the openings of the casing to be communicated in a vertical direction.

Because an outdoor unit of an air conditioner is ordinarily disposed outdoors, sometimes moisture such as rainwater flows into the fan chamber. For this reason, there is the problem that the heat-emitting part may short circuit when moisture becomes mixed and taken in with the air that is taken in order to cool the heat-emitting part.

However, here, a flow of air can be formed in the vicinity of the heat-emitting part as a result of the air passing through the openings in the casing passing through the water-stopping holes in the impermeable plate. Moreover, the water-stopping hole portions have structures which include portions facing upward in the flow path of the air. Thus, because it can be made more difficult than air for water, whose specific gravity is greater than that of air, to proceed upward, more moisture can be stopped, and the heat-emitting part can be sufficiently protected from the moisture.

An outdoor unit of an air conditioner of claim 7 comprises the outdoor unit of an air conditioner of claim 6, wherein the openings in the casing are intake ports that take in, to the inside of the casing, air outside the casing. Further, the casing further includes a discharge port that discharges, to the outside, air passing through the water-stopping holes in the impermeable plate.

Here, by disposing not just intake ports but also the discharge port, a flow of air from the intake ports to the discharge port inside the casing can be sufficiently created when the fan inside the fan chamber is rotated/driven. Thus, a flow of air in the vicinity of the heat-emitting part can also be sufficiently ensured, and the cooling of the heat-emitting part can be sufficiently conducted.

An outdoor unit of an air conditioner of claim 8 comprises the outdoor unit of an air conditioner of any one of claims 1 to 7, wherein the heat-emitting part is disposed at a position with a predetermined height from a bottom surface of the casing.

Here, even when water enters the inside of the casing through the open portions in the casing, the heat-emitting part is disposed at a position with a predetermined height from the bottom surface of the casing. For this reason, the heat-emitting part is disposed in state where it is above the bottom surface of the casing. Thus, even if moisture enters the inside of the casing from the outside, the entering moisture can be brought to the bottom surface of the casing. Consequently, even if moisture enters the inside of the casing from the outside, the risk of the moisture coming into direct contact with the heat-emitting part can be reduced.

An outdoor unit of an air conditioner of claim 9 comprises the outdoor unit of an air conditioner of any one of claims 1 to 8, wherein the heat-emitting part is a reactor used in an inverter circuit for conducting air-conditioning control.

Here, even if the heat-emitting part is a reactor used in an inverter circuit, the reactor can be sufficiently cooled by the flow of air inside the casing while preventing moisture from coming into contact with the reactor.

<Effects of the Invention>

In the outdoor unit of an air conditioner pertaining to claim 1, the effect of cooling the heat-emitting part can be improved while preventing moisture from coming into contact with the heat-emitting part.

In the outdoor unit of an air conditioner pertaining to claim 2, even when the outdoor unit becomes submerged in water, the risk of the heat-emitting part also becoming submerged in water can be reduced.

In the outdoor unit of an air conditioner pertaining to claim 3, the adverse affects

imparted to the other electrical parts by the heat emitted from the heat-emitting part can be reduced.

In the outdoor unit of an air conditioner pertaining to claim 4, the heat emitted from the heat-emitting part can be prevented from leaking to the other electrical parts, and the adverse affects that the heat-emitting part can exert on the other electrical parts can be more effectively suppressed.

In the outdoor unit of an air conditioner pertaining to claim 5, even when the casing is disposed in the fan chamber, an increase in the number of parts that obstruct the blowing in the blow chamber can be suppressed, and a reduction in the blowing efficiency can be suppressed.

In the outdoor unit of an air conditioner pertaining to claim 6, because it can be made more difficult than air for water, whose specific gravity is greater than that of air, to proceed upward, more moisture can be stopped, and the heat-emitting part can be sufficiently protected from the moisture.

In the outdoor unit of an air conditioner pertaining to claim 7, a flow of air in the vicinity of the heat-emitting part can also be sufficiently ensured, and the cooling of the heat-emitting part can be sufficiently conducted.

In the outdoor unit of an air conditioner pertaining to claim 8, even when moisture enters the inside of the casing from the outside, the risk of the moisture coming into direct contact with the heat-emitting part can be reduced.

In the outdoor unit of an air conditioner pertaining to claim 9, even if the heat-emitting part is a reactor used in an inverter circuit, the reactor can be sufficiently cooled by the flow of air inside the casing while preventing water from coming into contact with the reactor.

BRIEF DESCRIPTION OF THE DRAWINGS

<FIG. 1> A view of the external configuration of an air conditioner.

<FIG. 2> A diagram of a refrigerant circuit of the air conditioner.

<FIG. 3> A perspective view of the cross section of an outdoor unit.

<FIG. 4> A diagram of the schematic configuration of the outdoor unit.

<FIG. 5> An assembly diagram of a reactor box.

<FIG. 6> A front cross-sectional view of the reactor box.

<FIG. 7> A top cross-sectional view of the reactor box.

<FIG. 8> A right-side cross-sectional view of the reactor box.

DESCRIPTION OF THE REFERENCE NUMERALS

2	Outdoor Unit (Outdoor Unit)
27	Fan (Propeller Fan)
28a	Fan Base (Fan Motor Base)
40	Electrical Parts Unit
42	Other Electrical Parts (Electrical Parts)
52	Heat-Emitting Part (Reactor)
60	Casing (Body Casing)
71b	Openings (Water-Stopping Holes)
79	Bottom Surface
91	Impermeable plate (Water-Stopping Left Slit)
91a	Protruding Portions
91b	Water-Stopping Holes
O4	Discharge Port
S1	Fan Chamber (Blow Chamber)
S2	Machine Chamber

BEST MODE FOR CARRYING OUT THE INVENTION

<Overview of Multi-Type Air Conditioner>

An outdoor unit 2 of an air conditioner pertaining to an embodiment of the present invention is an outdoor unit 2 used in a multi-type air conditioner 100 such as shown in FIG. 1. The multi-type air conditioner 100 includes indoor units 1 comprising plural indoor units 1a to 1d that are connected to one outdoor unit 2 and attached to an indoor ceiling or the like. The outdoor unit 2 and the indoor units 1a to 1d are connected by connectors 3 (connectors 3a to 3d) comprising refrigerant pipes and transmission lines. The four indoor units 1a to 1d are disposed in respectively different chambers inside a home, a building, or a store, for example.

<Configuration of Refrigerant Circuit>

The configuration of a refrigerant circuit of the multi-type air conditioner 100 is shown in FIG. 2. The refrigerant circuit is configured by the one outdoor unit 2, the four indoor units 1a to 1d connected in parallel to the outdoor unit 2, and the refrigerant pipes.

The outdoor unit 2 is disposed with a compressor 20, a four-way switch valve 21, an outdoor heat exchanger 22, an accumulator 23, and the like. A discharge pipe thermistor 24 for detecting a discharge pipe temperature of a discharge side of the compressor 20 is attached to the discharge side of the compressor 20. Further, an outside air thermistor 25 for detecting the outside air temperature and an outdoor heat exchange thermistor 26 for

detecting the temperature of the outdoor heat exchanger 22 are disposed in the outdoor unit 2. Further, a propeller fan 27 for blowing air into the outdoor heat exchanger 22 is disposed. The propeller fan 27 is rotated/driven by a fan motor 28.

The indoor units 1a to 1d have the same configuration. Below, the indoor units 1a to 1d will be described using the indoor unit 1a as an example.

The indoor unit 1a is disposed with an indoor heat exchanger 30a and an electrically powered valve (expansion valve) 33a that are serially connected to each other. Further, the indoor unit 1a is disposed with a chamber temperature thermistor 31a for detecting the chamber temperature and an indoor heat exchange thermistor 32a for detecting the temperature of the indoor heat exchanger 30a. A liquid pipe thermistor 34a for detecting the temperature of a liquid pipe between the indoor heat exchanger 30a and the electrically powered valve 33a is disposed in a pipe between the indoor heat exchanger 30a and the electrically powered valve 33a. A gas pipe thermistor 35a that detects the temperature of refrigerant passing inside is disposed at the gas pipe side of the indoor heat exchanger 30a.

The configurations of the other indoor units 1b, 1c and 1d are the same as the configuration of the indoor unit 1a, and equivalent reference numerals are added to the indoor heat exchangers, the electrically powered valves, and the various kinds of thermistors in FIG. 2.

<Detailed Configuration of the Outdoor Unit>

The detailed configuration of the outdoor unit 2 in which the embodiment of the present invention is employed is shown in FIG. 3, which is a perspective view of the cross section of the outdoor unit 2, and in FIG. 4, which is a diagram of the schematic configuration of the outdoor unit 2. It will be noted that in FIG. 3 the direction represented by arrow D1 is a vertical direction D1, the direction represented by arrow D2 is a left-right direction D2, and the direction represented by arrow D3 is a front-rear direction D3.

As shown in FIG. 3 and FIG. 4, the inside of the outdoor unit 2 is divided by a partition plate 29 into a blow chamber S1 disposed with the propeller fan 27 and a machine chamber S2 disposed with various kinds of machines such as the compressor 20. The partition plate 29 has a shape that extends in the vertical direction D1, extends rearward in the front-rear direction D3, and then bends toward rightward and rearward. The partition plate 29 is disposed such that it covers the various kinds of machines such as the compressor 20, and partitions the space inside the outdoor unit 2.

As shown in FIG. 3, disposed inside the blow chamber S1 are the propeller fan 27, the fan motor 28, a fan motor base 28a, the outdoor heat exchanger 22 that is formed in a

substantial L-shape from rearward to leftward, and a reactor box 50 that houses a reactor 52. In the blow chamber S1 of the outdoor unit 2, the propeller fan 27 is rotated/driven by the fan motor 28, whereby air for conducting heat exchange in the outdoor heat exchanger 22 is taken in. Further, the propeller fan 27 is rotated/driven, whereby, as indicated by the arrow in FIG. 4, an airflow F is created inside the reactor box 50, as will be described later. In this manner, the blow chamber S1 serves as a blow flow path through which outside air passes from rearward to frontward in the front-rear direction D3. As shown in FIG. 3, the fan motor base 28a is disposed such that it extends in the vertical direction D1 in the vicinity of the center of the outdoor heat exchanger 22 and such that its upper portion extends in the front-rear direction. It will be noted that the fan motor base 28a is fastened in the vicinity of the center of the upper end of the outdoor heat exchanger 22 by a portion extending toward the rear side of the upper portion.

Parts such as the compressor 20, the four-way switch valve 21, the electrically powered valve 33, and an electrical parts unit 40 are disposed inside the machine chamber S2. Further, as shown in FIG. 3 and FIG. 4, the machine chamber S2 is covered by a substantially sealed casing and configured such that it is isolated to a certain extent from the outside air. As shown in FIG. 3, the compressor 20 is disposed in the vicinity of the substantial center of the inside of the machine chamber S2. As shown in FIG. 4, the four-way switch valve 21 and the electrically powered valve 33 are both disposed at the side of the compressor 20. The electrical parts unit 40 is disposed in the upper space inside the machine chamber S2 and houses inside a printed wiring board 41. Further, as shown in FIG. 4, a printed wiring board 41' that extends downward from the right end portion of the printed wiring board 41 is disposed in the electrical parts unit 40. The undersurfaces and the right side surfaces of both the printed wiring board 41 and the printed wiring board 41' serve as mounting surfaces on which are mounted many electrical parts 42, such as a heat-emitting power transistor 45, a condenser, a diode bridge, an IC for a control circuit for controlling the various machine parts of the outdoor unit 2, and a memory that stores a control program. Additionally, the compressor 20, the four-way switch valve 21, the electrically powered valve 33, and the fan motor 28 disposed below the electrical parts unit 40 of the machine chamber S2 are connected, via an opening disposed in the casing of the electrical parts unit 40, to plural connectors that are mounted on the printed wiring board 41 and the printed wiring board 41' via a wire harness. Moreover, various kinds of thermistors are disposed inside the machine chamber S2, and these thermistors are also connected to the connectors on the printed wiring board 41 and the printed wiring board 41'. The fan motor 28 disposed in the blow chamber

S1 is also connected to the connectors on the printed wiring board 41 and the printed wiring board 41'via the wire harness, whereby the fan motor 28 is rotated/controlled. It will be noted that an unillustrated inverter circuit is configured by the circuits on the printed wiring board 41 and the printed wiring board 41' and the reactor 52, and the number of rotations of the compressor 20 is variable-speed-controlled by this inverter circuit. Further, as shown in FIG. 4, a heat-dissipating fin 43 is disposed in the electrical parts unit 40 such that the heat-dissipating fin 43 runs from the machine chamber S2 to the blow chamber S1 in order to effectively disperse the heat emitted from the power transistor 45 that is a heat-emitting electrical part 42 mounted on the printed wiring board 41'. Thus, the heat emitted from the power transistor 45 can also be sufficiently cooled by the propeller fan 27 of the blow chamber S1.

<Detailed Configuration of the Reactor Box>

As shown in FIG. 3, the reactor box 50 is disposed such that it bridges the outdoor heat exchanger 22 and the fan motor base 28 in the upper space of the blow chamber S1 of the outdoor unit 2. Further, as shown in FIG. 4, the reactor box 50 is disposed at the left side of the inside of the blow chamber S1, which is disposed on the side opposite from the heat-dissipating fin 43 disposed in the electrical parts unit 40. The reactor box 50 houses inside the heat-emitting reactor 52.

As shown in FIG. 5, the reactor box 50 is configured by a body casing 60, which comprises a lower casing 70 and an upper casing 80, and a water-stopping casing 90, which is disposed inside the body casing 60.

As shown in the assembly diagram of FIG. 5, these casings form the reactor box 50 as a result of being screwed together with screws 61, 63, 64 and 65. Additionally, as shown in FIG. 8, which shows the right side of the reactor box, and in FIG. 5 and FIG. 3, the reactor box 50 is screwed with a screw 68 into a screw hole 28b punched in a corresponding portion of the later-described fan motor base 28a.

Further, the reactor 52 configures part of the inverter circuit that controls the number of rotations and the like of the compressor 20. As shown in FIG. 6, which is a front view of the reactor box, the reactor 52 is housed inside the reactor box 50. Further, the reactor 52 is connected to a connector on the underside of the printed wiring board 41 inside the electrical parts unit 40 via a reactor-use wire harness (not shown) extending such that it runs over the rear side of the fan motor base 28a and away from the partition plate 29. The reactor 52 configures the inverter circuit together with the circuit disposed on the printed wiring board 41 and controls the number of rotations of the compressor 20. The reactor 52 has the

property that its temperature rises and it emits heat when the air conditioner 100 runs.

Below, the water-stopping casing 90 and the body casing 60 that configure the reactor box 50 will be described.

(Water-Stopping Casing)

As shown in FIG. 5, the water-stopping casing 90 is configured by a water-stopping left slit 91, a water-stopping rear slit 91', a front surface 93, contact plates 95, a right side surface 97, and an upper surface 99.

As shown in FIG. 6, which is a front view, and in FIG. 7, which is a top view, the water-stopping left slit 91 configures the left side surface of the water-stopping casing 90. As shown in FIG. 6, three protruding portions 91a are disposed on the water-stopping slit 91. Water-stopping holes 91b are disposed in the lower end portions of the three protruding portions 91a. As shown in FIG. 6 and FIG. 7, the protruding portions 91a are formed such that they extend further toward the left side from the left side surface of the water-stopping casing 90 and such that their degree of protrusion increases downward. The water-stopping holes 91b are openings disposed in the lower end portions of the protruding portions 91a and are formed such that they are slightly slanted rightward and downward when seen in front view. As shown in FIG. 6, the water-stopping holes 91b allow a double water-stopping space S5 that configures the space at the right side of the water-stopping slit 91 in the left-right direction D2 and a left side water-stopping space S7 that configures the space at the left side of the water-stopping slit 91 to be communicated in a direction slightly slanted to the right from the vertical direction D1.

As shown in FIG. 8, which is a right side view, and in FIG. 7, the water-stopping rear slit 91' has the same shape as the water-stopping slit 91 and configures the rear surface of the water-stopping casing 90. As shown in FIG. 8, the water-stopping rear slit 91' includes three protruding portions 91'a that protrude toward the rear side of the water-stopping casing 90 and water-stopping holes 91'b that are disposed in the lower end portions of the protruding portions 91'a. As shown in FIG. 8, the protruding portions 91'a are formed such that they protrude further toward the rear side in the front-rear direction D3 from the rear surface of the water-stopping casing 90 and such that their degree of protrusion increases downward. The water-stopping holes 91'b are openings disposed in the lower end portions of the protruding portions 91'a and are formed such that they are slightly slanted leftward and downward when seen in right side view. As shown in FIG. 8 and FIG. 7, the water-stopping holes 91'b allow the double water-stopping space S5 that configures the space at the front side of the water-stopping slit 91' in the front-rear direction D3 and a rear water-stopping space S8 that

configures the space at the rear side of the water-stopping slit 91' to be communicated in a direction slightly slanted to the left from the vertical direction D1 when seen in right side view.

As shown in FIG. 5 and FIG. 6, the upper surface 99 configures the upper surface of the water-stopping casing 90 and includes two reactor screw holes 92 and two reactor-attaching concave portions 98. The reactor screw holes 92 are punched at two places in the upper surface 99 such that they penetrate the upper surface 99 in the vertical direction D1. The two reactor-attaching concave portions 98 are disposed at the front side and the rear side at the right side of the upper surface 99 and are formed such that they are slightly recessed downward. An opening that opens from the left side in the left-right direction D2 toward the rear side in the front-rear direction D3 is disposed in the recessed portion at the front side, and an opening that opens from the left side in the left-right direction D2 toward the front side in the front-rear direction D3 is disposed in the recessed portion at the rear side.

As shown in FIG. 5, the front surface 93 configures the front side surface of the water-stopping casing 90 and includes a screw hole 93a punched in the front-rear direction D3. As shown in FIG. 6, the contact plates 95 are disposed such that they extend from the lower end portion of the water-stopping slit 91 to the right side in the left-right direction D2. As shown in FIG. 5 and FIG. 6, the right side surface 97 configures the right side surface of the water-stopping casing 90 and includes a screw hole 97a punched in the left-right direction D2. Further, as shown in FIG. 5, FIG. 6 and FIG. 8, the right side surface 97 also includes a heat-dissipating opening 97b that is long in the front-rear direction D3 and penetrates the right side surface 97 in the left-right direction D2.

(Body Casing)

The body casing 60 is configured as a result of the lower casing 70 and the upper casing 80 being combined in the vertical direction D1.

(Lower Casing)

As shown in FIG. 5, the lower casing 70 is configured by a lower left slit 71, a right side surface 73, a front fixing portion 74, a rear fixing portion 75, drain holes 76, an L-shaped plate 77, a slanted surface 78, and a bottom surface 79.

As shown in FIG. 6, which is a front view, and in FIG. 7, which is a top view, the upper portion of the lower left slit 71 extends in the vertical direction D1, and the lower portion of the lower left slit 71 is bent in the right direction and extends rightward and downward to configure the left side surface of the lower casing 70. As shown in FIG. 6 and

FIG. 7, three protruding portions 71a are disposed on the lower left slit 71. Water-stopping holes 71b are formed in the lower end portions of the three protruding portions 71a. As shown in FIG. 6, the protruding portions 71a are formed such that they protrude further toward the left side from the left side surface of the lower casing 70 and such that their degree of protrusion increases downward. The water-stopping holes 71b are openings disposed in the lower end portions of the protruding portions 71a and are formed such that they are slightly slanted rightward and downward when seen in front view. As shown in FIG. 6, the water-stopping holes 71b allow the blow chamber S1 outside the reactor box 50 that configures the space at the right side of the lower left slit 71 in the left-right direction D2 and the left side water-stopping space S7 that configures the space at the right side of the lower left slit 71 to be communicated in a direction slightly slanted to the right from the vertical direction D1.

As shown in FIG. 6 and FIG. 8, the bottom surface 79 extends rightward in the left-right direction D2 from the lower end portion of the lower left slit 71 and configures the bottom surface of the lower casing 70. As shown in FIG. 6, the drain holes 76 are openings disposed such that they allow the blow chamber S1 outside the reactor box 50 and the left side water-stopping space S7 to be communicated at the lower end portion of the lower left slit 71 and the left end portion of the bottom surface 79. As shown in FIG. 5, the drain holes 76 are disposed at two places: the front side and the rear side. As shown in FIG. 6, the slanted surface 78 extends rightward and upward from the right end portion of the bottom surface 79 and configures the right lower surface of the lower casing 70. As shown in FIG. 6, the right side surface 73 configures a surface that extends upward in the vertical direction D1 from the upper end portion of the slanted surface 78. The right side surface 73 includes a screw hole 73a punched in the left-right direction D2. As shown in FIG. 5 and FIG. 6, the L-shaped plate 77 configures an L-shaped surface that extends rightward in the left-right direction D2 from the upper end portion of the right side surface 73 and then bends upward in the vertical direction D1. As shown in FIG. 5, FIG. 7 and FIG. 8, the front fixing portion 74 is a surface that extends frontward from the center portion of the upper end of the front surface of the lower casing 70 and includes a screw hole 74a punched in the vertical direction D1 in the vicinity of the center of this surface. The rear fixing portion 75 is the same as the front fixing portion 74, and as shown in FIG. 5, FIG. 7 and FIG. 8, is a surface that extends rearward from the center portion of the upper end of the rear surface of the lower casing 70 and includes a screw hole 75a punched in the vertical direction D1 in the vicinity of the center of this surface.

(Upper Casing)

As shown in FIG. 5, the upper casing 80 is configured by an upper rear slit 81, a front surface 83, a front fixed portion 84, a rear fixed portion 85, a wind-guide plate 87, a reactor box-disposing plate 88, and a top surface 89.

As shown in FIG. 8 and FIG. 7, the upper rear slit 81 has the same shape as that of the water-stopping rear slit 91', configures the rear surface 81 of the upper rear slit, and includes three protruding portions 81a and water-stopping holes 81b formed in the protruding portions 81a. As shown in FIG. 8 and FIG. 7, the protruding portions 81a are formed such that they protrude further toward the rear side from the rear surface of the water-stopping casing 90 and such that their degree of protrusion increases downward. As shown in FIG. 8, the water-stopping holes 81b are openings disposed in the lower end portions of the protruding portions 81a and formed such that they slightly slant leftward and downward when seen in right side view. As shown in FIG. 8, the water-stopping holes 81b allow the rear water-stopping space S8 that configures the space at the rear side of the water-stopping slit 91' and the blow chamber S1 outside the reactor box 50 facing the rear side of the upper rear slit 81 to be communicated in a direction slightly slanted to the left from the vertical direction D1 when seen in right side view.

The upper surface 89 configures the upper surface of the upper casing 80, and includes concave portions 82, a nipping portion 86, and a fastening portion 89a. As shown in FIG. 6 and FIG. 5, the concave portions 82 are formed at two places in the upper surface 89 of the upper casing 80 such that they are upwardly recessed at places corresponding to the positions of screw holes used in the later-described fixing of the reactor 52. As shown in FIG. 5, FIG. 6 and FIG. 7, the nipping portion 86 is disposed in the vicinity of the left end portion of the upper surface 89 of the upper casing 80. The nipping portion 86 is configured by an outer nipping portion 86a that extends downward in the vertical direction D1 in the vicinity of the left end portion of the upper surface 89 of the upper casing 80 and an inner nipping portion 86b that extends downward from a position further to the right side than the outer nipping portion 86a. It will be noted that the left side portion of the inner nipping portion 86b from the upper surface end surface penetrates the upper surface 89 in the vertical direction D1. As shown in FIG. 5, FIG. 6 and FIG. 7, the fastening portion 89a configures the right end portion of the upper surface 89 of the upper casing 80 and is formed such that it rises slightly upward in order to contact the fan motor base 28a.

As shown in FIG. 5 and FIG. 6, the wind-guide plate 87 configures a surface extending downward in the vertical direction D1 from the left end portion of the fastening

portion 89a configuring part of the upper surface 89 of the upper casing 80. As shown in FIG. 5, FIG. 7 and FIG. 8, the reactor box-disposing plate 88 is disposed such that it extends rearward from the rear surface of the right side of the upper casing 80 and then bends rightward. A screw hole 88a is disposed in the reactor box-disposing plate 88 such that the screw hole 88a communicates in the front-rear direction D3 in the surface disposed such that it bends rightward. The front surface 83 configures the front surface of the upper casing 80 and includes a screw hole 83a punched in the front-rear direction D3.

As shown in FIG. 7 and FIG. 8, the front fixed portion 84 is a surface that extends frontward from the vicinity of the center portion of the lower end of the front surface of the upper casing 80, and includes a screw hole 84a punched in the vertical direction D1 in the vicinity of the center of this surface. The rear fixed portion 85 is the same as the front fixed portion 84, and as shown in FIG. 7 and FIG. 8, is a surface that extends rearward from the center portion of the lower end of the rear surface of the upper casing 80, and includes a screw hole 85a punched in the vertical direction D1 in the vicinity of the center of this surface.

<Fixing of the Reactor Box>

The reactor box 50 is configured as a result of the body casing 60 and the water-stopping casing 90 being combined together. The reactor 52 is housed inside the reactor box 50, and the reactor box 50 is fixed to the inside of the blow chamber 91 of the outdoor unit 2.

(Operation of Fixing the Reactor Box and the Reactor)

As shown in FIG. 5, the reactor 52 is fixed inside the reactor box 50 configured by the water casing 90 and the body casing 60, which is configured by the lower casing 70 and the upper casing 80. Specifically, as shown in FIG. 5 and FIG. 6, the reactor 52 is fixed by the following procedure.

To begin, the reactor 52 is fixed to the water-stopping casing 90. First, as shown in FIG. 6 and FIG. 5, a right upper end portion 52a of the reactor 52 is slid rightward in the left-right direction D2 with respect to the openings disposed inside the reactor-attaching concave portions 98 in the upper surface 99 of the water-stopping casing 90. When the reactor 52 is slid rightward, the right upper end portion 52a of the reactor 52 becomes engaged with the reactor-attaching concave portions 98 in the upper surface of the water-stopping casing 90. Further, in regard to a left side portion 52b of the reactor 52, as shown in the front view of FIG. 6 and in FIG. 5, the reactor screw hole 92 punched in the upper surface of the water-stopping casing 90 and an unillustrated screw hole punched in the

corresponding portions of the reactor 52 become communicated and screwed together with the screw 62 in the substantial vertical direction D1. At this time, as shown in FIG. 6, the screw 62 protrudes further upward than the upper surface of the water-stopping casing 90, but because a space is disposed by the corresponding concave portion 82 in the upper surface 89 of the upper casing 80, the protruding portion can be housed inside this space. In this manner, the reactor 52 is fixed to the water-stopping casing 90. It will be noted that, as shown in FIG. 5, two reactor screw holes 92 are disposed in the water-stopping casing 90 and two concave portions 82 are disposed in the upper casing 80, and the reason for this is ensure that reactors of different sizes can be housed.

Next, the water-stopping casing 90 is fixed to the lower casing 70 of the body casing 60. Here, as shown in FIG. 5 and FIG. 6, the right side surface 97 of the water-stopping casing 90 is disposed facing left and the right side surface 73 of the lower casing 70 is disposed facing right, and both are joined together from the left-right direction D2. Then, they are screwed together with the screw 61 as a result of the screw hole 97a punched in the right side surface 97 of the water-stopping casing 90 and the screw hole 73a punched in the right side surface 73 of the lower casing 70 becoming mutually communicated. In this manner, the water-stopping casing 90 and the lower casing 70 are fixed.

Moreover, the water-stopping casing 90 is fixed to the upper casing 80 of the body casing 60. Here, as shown in FIG. 5 and FIG. 6, the front surface 93 of the water-stopping casing 90 is disposed facing rearward and the front surface 83 of the upper casing 80 is disposed facing frontward, and both are joined together from the front-rear direction D3. Then, they are screwed together with the screw 63 as a result of the screw hole 93a punched in the front surface 93 of the water-stopping casing 90 and the screw hole 83a punched in the front surface 83 of the upper casing 80 becoming mutually communicated. In this manner, the water-stopping casing 90 and the upper casing 80 are fixed.

Then, finally the upper casing 80 and the lower casing 70 are fixed together, and the body casing 60 housing the reactor 52 is completed. Here, as shown in FIG. 5, FIG. 7 and FIG. 8, in regard to the front side of the body casing 60, the front fixed portion 84 of the upper casing 80 and the front fixing portion 74 of the lower casing 70 are joined together from the vertical direction D1. Then, they are screwed together with the screw 64 as a result of the screw hole 84a punched in the front fixed portion 84 of the upper casing 80 and the screw hole 74a punched in the front fixing portion 74 of the lower casing 70 becoming mutually communicated. Further, in regard to the rear side of the body casing 60, the rear fixed portion 85 of the upper casing 80 and the rear fixing portion 75 of the lower casing 70

are joined together from the vertical direction D1. Then, they are screwed together with the screw 65 as a result of the screw hole 85a punched in the rear fixed portion 85 of the upper casing 80 and the screw hole 75a punched in the rear fixing portion 75 of the lower casing 70 becoming mutually communicated. In this manner, the upper casing 80 and the lower casing 70 are fixed. It will be noted that, as shown in FIG. 6, when the reactor box 50 is assembled, a discharge port O4 is formed between the wind-guide plate 87 disposed in the upper casing 80 and the L-shaped plate 77.

It will also be noted that the fixing means of fixing the casings together are not limited to fixing means where the casings are screwed together with screws in this manner. For example, fixing means may also be employed where the casings are fixed together by disposing pawl portions and engaged portions that engage with the pawl portions.

(Operation of Fixing the Reactor Box to the Outdoor Unit)

The reactor box 50 housing inside the reactor 52 as described above is fixed in the blow chamber S1 of the outdoor unit 2 as shown in FIG. 3.

First, as shown in FIG. 3, the fastening portion 89a of the upper casing 80 of the reactor box 50 is disposed such that it covers from above, and engages with, the portion of the fan motor base 28a extending frontward in the front-rear direction D3 from the upper end portion of the center of the outdoor heat exchanger 22.

Further, as shown in FIG. 3 and FIG. 6, the nipping portion 86 disposed on the left side of the upper surface 89 of the upper casing 80 of the reactor box 50 nips the left side portion of the outdoor heat exchanger 22. Specifically, the nipping portion 86 nips the left side portion of the outdoor heat exchanger 22 such that the left side portion of the outdoor heat exchanger 22 is nipped between the outer nipping portion 86a from the left side and the inner nipping portion 86b from the right side.

Then, as shown in FIG. 3, FIG. 7 and FIG. 8, the reactor box-disposing plate 88 disposed in the upper casing 80 and the portion of the fan motor base 28a disposed along the outdoor heat exchanger 22 are joined together from the front-rear direction D3. Moreover, as shown in FIG. 5, FIG. 6, FIG. 7 and FIG. 8, they are screwed together with the screw 68 as a result of the screw hole 88a punched in the reactor box-disposing plate 88 and the screw hole 28b punched in the corresponding portion of the fan motor base 28a becoming mutually communicated, whereby the reactor box 50 is fixed inside the blow chamber S1.

<Operation when the Reactor is Cooled>

In the blow chamber S1 of the outdoor unit 2 of the air conditioner 100, the propeller fan 27 is disposed as shown in FIG. 3, and the airflow F represented by the one-dot chain line

in FIG. 4 is formed in the blow chamber S1 as a result of the propeller fan 27 being rotated/driven by the fan motor 28. The airflow F will be specifically described below.

The air outside the outdoor unit 2 is taken into the blow chamber S1 through the outdoor heat exchanger 22 from the outer rear of the outdoor unit 2 as a result of an airflow being formed in accompaniment with the rotation/driving of the propeller fan 27. As represented by arrows F1, F2, F3, F1', F2' and F3' shown in FIG. 6, FIG. 8, and FIG. 7, which is a top view of the reactor box 50, the air taken into the blow chamber S1 is taken into the left side water-stopping space S7 through the lower left slit 71 disposed in the lower casing 70, and is taken into the rear water-stopping space S8 through the upper rear slit 81 disposed in the upper casing 80. In this manner, the air taken into the left side water-stopping space S7 and into the rear water-stopping space S8 is taken into the double water-stopping space S5 where the reactor 52 is disposed through the water-stopping left slit 91 and the water-stopping rear slit 91' disposed in the water-stopping casing 90. Then, a flow of air is created in the vicinity of the reactor 52 housed in the double water-stopping space S5, whereby the heat emitted from the heat-emitting reactor 52 is dispersed. In this manner, in the double water-stopping space S5, the air passing through the vicinity of the reactor 52 passes through the heat-dissipating opening 97b disposed in the right side surface 97 of the water-stopping casing 90, passes above the L-shaped plate 77 of the lower casing 70, passes through the discharge port O4 that is a space between the wind-guide plate 87 disposed in the upper casing 80 and the L-shaped plate 77, and is discharged to the blow chamber S1 outside the reactor box 50.

The reason the airflow F is formed such that air is taken into the reactor box 50 in this manner is so that the outside air is taken in the direction from the rear surface and the left side surface of the outdoor heat exchanger 22 of the outdoor unit 2 to the inside of the blow chamber S1 when the propeller fan 27 of the blow chamber S1 is rotated/driven. For this reason, the outside air enters the inside of the reactor box 50 through the lower left slit 71 and the upper rear slit 81 of the reactor box 50.

Further, here, the air inside the reactor box 50 is discharged to the outside of the reactor box 50 through the space between the wind-guide plate 87 disposed in the upper casing 80 and the L-shaped plate 77. The reason the airflow F4, where the air is discharged to the outside blow chamber S1 via the discharge port O4 at the right side of the double water-stopping space S5 inside the reactor box 50, is formed in this manner is so that a strong airflow resulting from the propeller fan 27 is formed from rearward to frontward in the front-rear direction D3 at the right side of the reactor box 50 and so that a state where the

pressure is low in comparison to the pressure in the vicinity of the center of the inside of the reactor box 50 is formed in the vicinity of the right side of the inside of the reactor box 50 where the air is discharged. In this manner, the air inside the reactor box 50 flows toward the vicinity of the heat-dissipating opening 97b where the pressure is low, and is discharged to the blow chamber S1 outside the reactor box 50 via the discharge port O4 in the reactor box 50.

<Water-Stopping Operation of the Reactor Box>

Ordinarily, the outdoor unit 2 is disposed outdoors, and there is the potential for the outdoor unit 2 to receive rainwater. And sometimes, not only air but also moisture becomes mixed inside the blow chamber S1 as a result of the propeller fan 27 disposed inside the outdoor unit 2 rotating. Here, as shown in FIG. 7, the reactor 52 employs a double structure where the left side and the rear side of the reactor 52, which are the sides which take in the outside air, are doubly covered by the reactor box 50. For this reason, the reactor 52 can be sufficiently protected from moisture.

Specifically, the path where the outside air is taken in from the left side is covered once by the lower left slit 71 of the lower casing 70 and covered twice by the water-stopping left slit 91 of the water-stopping casing 90. Further, the path where the outside air is taken in from the rear side is covered once by the upper rear slit 81 of the upper casing 80 and covered twice by the water-stopping rear slit 91' of the water-stopping casing 90. Because the path from the left side and the path from the rear side are substantially the same, the double structure will be described below using the double structure of the left side as an example.

In the outdoor unit 2, as mentioned previously, air and moisture enter the blow chamber S1 together, and as shown in FIG. 6 and FIG. 7, sometimes they reach the vicinity of the reactor box 50 due to the airflows F1 and F1'. When moisture and outside air reach the vicinity of the reactor box 50 due to the airflows F1 and F1' in this manner, first, as shown in FIG. 6 and FIG. 7, a large portion of the moisture is stopped by the protruding portions 71a of the lower left slit 71 of the lower casing 70 serving as the first cover such that the moisture does not enter the inside of the reactor box 50. Then, the air and a minute amount of moisture flow rightward and diagonally upward in plan view due to the airflow F2 shown in FIG. 6 and reach the vicinity of the water-stopping holes 71b in the lower left slit 71. However, because the specific gravity of the moisture is greater than that of the air, it is difficult for the moisture to proceed upward and pass through the water-stopping holes 71b in the lower left slit 71. Moreover, a minute amount of moisture has the possibility of

reaching the left side water-stopping space S7 through the lower left slit 71. Because the power of air-flow F2 passes over lower left slit 71, it becomes weak. Therefore, the minute amount of moisture that passed over lower left slit 71 falls downward in the left side water-stopping space S7. and the minute amount of moisture passes through the drain holes 76 and is again discharged to the inside of the blow chamber S1 outside the reactor box 50. Further, because the flow of passing air weakens in the vicinity of the water-stopping holes 91b in the water-stopping left slit 91 of the water-stopping casing 90, similar to the water-stopping holes 71b in the lower left slit 71, it is difficult for even a minute amount of moisture reaching the left side water-stopping space S7 to pass upward. That is, even moisture moving due to the momentum of the airflow F2 cannot pass upward through the water-stopping holes 91b because the flow of passing air weakens in the vicinity of the water-stopping holes 91b in the water-stopping left slit 91. For this reason, the airflow F3 can be created which allows virtually no moisture to pass through the water-stopping holes 91b in the water-stopping left slit 91 of the water-stopping casing 90 but does allow air to pass.

In this manner, it becomes difficult for moisture to enter the inside of the double water-stopping space S5 due to the double structure of the reactor box 50.

<Characteristics>

(1)

In an outdoor unit of a conventional air conditioner, disposition places and disposition structures are employed, such as disposing the reactor 52, which is a heat-emitting part, inside the machine chamber 2. For this reason, sometimes it becomes difficult for the heat emitted from the reactor 52 to escape and it is difficult to sufficiently cool the reactor 52 because a flow of air is only partially formed in the vicinity of the reactor 52. In this manner, when the temperatures of the electrical parts 42 and the reactor 52 rise, there is the potential for them to become unable to sufficiently exhibit their functions due to factors such as restrictions being placed on the conditions of use of the electrical parts 42 and the reactor 52. Moreover, in accompaniment therewith, it becomes necessary to separately develop/manufacture a new reactor 52 having excellent heat resistance, which is expensive.

However, in the outdoor unit 2 of the air conditioner 100 in the above-described embodiment, the reactor 52, which is a heat-emitting part, is housed in the reactor box 50 in which the discharge port O4 and the outside air intake ports of the water-stopping holes 71b in the lower left slit 71 and the water-stopping holes 91b in the water-stopping left slit 91 are disposed, and the reactor 52 is set in the blow chamber S1 where the airflow F is formed by

the propeller fan 27. For this reason, the airflow F is created from the outside air intake ports of the water-stopping holes 71b in the lower left slit 71 and the water-stopping holes 91b in the water-stopping left slit 91, through the inside of the reactor box 50, and toward the discharge port O4, so that the heat emitted from the reactor 52 can be dispersed and the accumulation of heat can be suppressed. For this reason, the effect of cooling the reactor 52 can be improved. Further, there is thus no longer the necessity to separately develop/manufacture a new reactor with excellent heat resistance.

(2)

In recent years, in accompaniment with the narrowing and the like of the space where an outdoor unit is disposed, the compactification of entire outdoor units has been advancing. However, when the entire outdoor unit is narrowed in this manner, the distance between where the reactor 52, which is a heat-emitting part, and the electrical parts 42, which are housed in the electrical parts unit 40 and are relatively susceptible to heat, are disposed becomes shorter, which can lead to the electrical parts 42 being adversely affected by the heat emitted from the reactor 52. Further, it becomes necessary to develop/manufacture electrical parts with excellent heat resistance, and the cost rises. There are examples where the electrical parts unit 40 and the reactor box 50 are disposed inside the machine chamber S2, but in this case, the heat-dissipating fin 43 disposed in the electrical parts unit 40 in order to ensure heat dissipation becomes disposed in the vicinity of the reactor 52, so that the effect of cooling the electrical parts unit 40 with the heat-dissipating fin 43 is reduced.

However, in the outdoor unit 2 pertaining to the above-described embodiment, the electrical parts unit 40, in which the electrical parts 42 are housed, and the reactor box 50, in which the reactor 52 is housed, are disposed in separate chambers to ensure a certain distance between the two. For this reason, it can be made difficult for the electrical parts 42 to be adversely affected by the heat emitted from the reactor 52. Thus, compactification of the outdoor unit 2 can be achieved while ensuring an ability to dissipate the heat of the reactor 52. Further, the manufacturing cost can also be kept low because the design temperature of the materials of the reactor 52 and the electrical parts 42 can be lowered and the heat resistance can be lowered somewhat.

Further, because even the machine parts disposed below the electrical parts unit 40 inside the machine chamber S2 with the emit-heat property and the electrical parts 42 housed inside the electrical parts unit 40 with the emit-heat property are disposed at positions mutually away from the reactor 52, the mutually emitted heat can be efficiently dispersed.

(3)

It will be noted that even when the reactor 52 is disposed in the blow chamber S1 and sufficient cooling is conducted, there is the potential for outdoor rainwater or the like to enter the blow chamber S1 of the outdoor unit 2 and for moisture to be imparted to the reactor 52, which may lead to a short circuit. For this reason, the separate development/manufacture of a reactor with excellent water resistance becomes necessary, which is expensive. Further, as a form where the reactor 52 is disposed at a position away from the electrical parts unit 40, the reactor 52 can be disposed in the vicinity of the bottom frame of the outdoor unit 2 at a position slightly away from the electrical parts unit 40 in the space above the machine chamber S2. However, in this case, in cold regions, moisture such as rainwater grows at a fast speed in the vicinity of the bottom surface of the outdoor unit 2 and becomes ice, and there is also the potential for the reactor 52 itself to become submerged in water, which may lead to a short circuit.

However, in the outdoor unit 2 of the air conditioner 100 in the above-described embodiment, the water-stopping slit 91, which employs a structure where it is more difficult for water than air to pass therethrough, is disposed between the reactor 52 and the water-stopping holes 71b in the lower left slit 71 of the reactor box 50. For this reason, in the reactor box 50 in the above-described embodiment, a double structure resulting from the water-stopping holes 71b in the lower left slit 71 and the water-stopping holes 91b in the water-stopping left slit 91 can be disposed. For this reason, even when air and moisture become mixed inside the reactor box 50 through the water-stopping holes 71b in the lower left slit 71, the reactor 52 can be protected because the moisture is effectively stopped by the water-stopping holes 91b in the water-stopping left slit 91. Further, the reactor 52 is fixed under the top plate of the outdoor unit 2, which is the upper space in the outdoor unit 2. For this reason, the risk of the reactor 52 becoming submerged in water can also be reduced. Thus, there is no longer the necessity of separately developing/manufacturing a new reactor with excellent water resistance.

(4)

Further, the reactor box 50 in the above-described embodiment is disposed in the upper portion in the vertical direction D1, and at the left side in the left-right direction D2, of the blow chamber S1 of the outdoor unit 2. For this reason, the reactor box 50 is disposed as far away as possible from the center portion of the blow chamber S1 where the propeller fan 27 is disposed and where the blowing strength is strong. For this reason, even if the reactor box 50 is disposed in the blow chamber S1, the blowing resistance can be prevented from increasing due to the propeller fan 27. For this reason, even if the reactor box 50 is

disposed in the blow chamber S1, the blowing performance of the propeller fan 27 can be maintained as high as possible.

It will be noted that the reactor box 50 has a shape where the lower right portion is cut out from a substantially rectangular parallelepiped. For this reason, the reactor box 50 has a structure that does not, as much as possible, obstruct the flow of air in the center portion of the blow chamber S1 where the propeller fan 27 is disposed. For this reason, even if the reactor box 50 is disposed inside the blow chamber S1, the blowing resistance can more effectively be prevented from increasing, and deterioration of the blowing performance can be made gradual.

Moreover, in the outdoor unit 2 of the air conditioner 100 in the above-described embodiment, the reactor box 50 can be disposed in the blow chamber S1 without disposing a new support rod for disposing the reactor box 50 but by using the fan motor base 28a used to dispose the fan motor 28. For this reason, the reactor box 50 can be disposed even when a support rod for disposing the reactor box and which becomes an obstruction to blowing is not disposed.

(5)

The drain holes 76, which can drain to the outside any water passing through the water-stopping holes 71b in the lower left slit 71 and entering the inside of the reactor box 50, are disposed in the outdoor unit 2 of the air conditioner 100 in the above-described embodiment. Further, the contact plates 95 of the water-stopping casing 90 are disposed which contact the bottom surface 79 of the lower casing 70 of the reactor box 50 such that conversely water does not enter the inside of the reactor box 50 through the drain holes 76.

For this reason, water passing through the water-stopping holes 71b of the lower left slit 71 and entering the inside of the reactor box 50 can be discharged to the blow chamber S1 outside the reactor box 50 such that the water is brought to the vicinity of the bottom surface of the left side water-stopping space S7 of the reactor box 50. For this reason, the ability to stop water with respect to the reactor 52 can be more reliably ensured.

<Other Embodiments>

An embodiment of the present invention has been described above, but the present invention should not be construed as being limited to this embodiment and can be variously modified in a range that does not depart from the gist of the invention.

(A)

In the outdoor unit 2 of the air conditioner 100 in the above-described embodiment, the outdoor unit 2 was described as an example where the reactor box 50 is double-structured

and disposed in the blow chamber S1 in order to improve the effect of cooling the reactor 52 while preventing moisture from contacting the reactor 52. That is, the reactor box 50 is employed which has a structure including a portion facing upward in the flow path of the air, the air and moisture are separated due to the property where, based on the specific gravities of water and air, it becomes difficult for water, whose specific gravity is larger than that of air, to rise upward, so that the ability of the reactor box 50 to stop water is secured while ensuring the effect of cooling the reactor 52.

However, the present invention is not limited to this. The reactor box may also be one where numerous tiny holes such as in a sponge are disposed, for example, as the water-stopping left slit 91 and the water-stopping rear slit 91' of the water-stopping casing 90 through which it is more difficult for water to pass than air. In this case, in view of the size of water droplets passing through the lower left slit 71 of the lower casing 70 and the upper rear slit 81 of the upper casing 80 of the reactor box 50, it is conceivable to dispose a porous water-stopping left slit and a porous water-stopping rear slit disposed with numerous small holes that can trap water droplets of a predetermined size based on the sizes of those water droplets. With a porous water-stopping left slit and a porous water-stopping rear slit, many of the water droplets of the water droplets (moisture) and air passing through the lower left slit 71 of the lower casing 70 and the upper rear slit 81 of the upper casing 80 can be trapped so that only the air is allowed to pass therethrough and the water droplets and air are separated. Here, the moisture that is trapped in the porous water-stopping left slit and the porous water-stopping rear slit falls downward in the vertical direction D1 when a certain amount is accumulated. Consequently, in the same manner as in the above-described embodiment, the water droplets passing through the lower left slit 71 of the lower casing 70 and the upper rear slit 81 of the upper casing 80 can be discharged to the blow chamber S1 outside the reactor box 50 through the drain holes 76 disposed in the lower casing 70.

Further, the outdoor unit may also be one where slits having structures like the water-stopping left slit 91 and the water-stopping slit 91' of the water-stopping casing 90 are superposed in several layers and disposed between the reactor 52 and the lower left slit 71 of the lower casing 70 and the upper rear slit 81 of the upper casing 80 of the reactor box 50. Further, the outdoor unit may also be one where a plurality of the water-stopping left slit 91 and the water-stopping rear slit 91' of the water-stopping casing 90 are integrally formed, because it suffices as long as the water-stopping left slit 91 and the water-stopping rear slit 91' are disposed between the reactor 52 and the lower left slit 71 of the lower casing 70 and the upper rear slit 81 of the upper casing 80 of the reactor box 50.

The same effects as those previously mentioned can be obtained even with a reactor box of an outdoor unit where these structures are employed.

(B)

In the outdoor unit 2 of the air conditioner 100 in the above-described embodiment, the heat-emitting electrical parts such as the power transistor 45 disposed in the electrical parts unit 40 employ structures that can allow heat to escape via the heat-dissipating fin 43 disposed such that it runs through the blow chamber S1 in the electrical parts unit 40.

However, a structure may also be employed where both the reactor box 50 and the electrical parts unit 40 are disposed in the blow chamber S1. In this case, when the blow chamber S1 is relatively wide, both can be disposed at more distant positions. It will be noted that in the case of an outdoor unit disposed with two of the propeller fans 27, both can be particularly easily disposed apart in the blow chamber S1. Additionally, in this case also, the reactor 52 and the heat-emitting electrical parts 42 can be disposed furthest apart such that they can be more effectively cooled.

It will also be noted that the part emitting the most heat of the electrical parts 42 disposed in the electrical parts unit 40 may be selected and disposed in the blow chamber S1.

(C)

In the outdoor unit 2 of the air conditioner 100 in the above-described embodiment, the reactor box 50 is disposed in the upper space of the blow chamber S1. However, when there is no potential for the reactor 52 housed in the reactor box 50 to become submerged in water, the reactor box 50 can also be disposed on the bottom surface of the outdoor unit 2. Even in this case, similar to the outdoor unit 2 of the above-described air conditioner 100, the resistance of the blowing resulting from the propeller fan 27 can be suppressed so that the reactor can be efficiently cooled.

(D)

In the above-described embodiment, the reactor box 50 is configured by three casings. However, the reactor box 50 may also be one where three casings are integrally formed such that the structure is the same as that in the above-described embodiment.

(E)

In the reactor box 50 in the above-described embodiment, the reactor 52 is disposed with the reactor-attaching concave portions 98 in the upper surface 99 of the water-stopping casing 90. However, the reactor 52 may also have a structure where an attachment portion for disposing the reactor 52 is disposed in the side surface of each casing, because it suffices for the reactor 52 to be disposed such that it does not contact the bottom surface 79 of the

reactor box 50 where there is the potential for moisture to accumulate.

INDUSTRIAL APPLICABILITY

According to the outdoor unit of the air conditioner pertaining to the present invention, the effect of cooling heat-emitting parts can be improved while preventing water from contacting the heat-emitting parts, which is particularly effective with respect to an outdoor unit of an air conditioner where a fan chamber disposed with a fan and a machine chamber other than the fan chamber are partitioned and where heat-emitting parts are disposed.